

EFFECT ON SOME GROWTH REGULANTS ON GROWTH AND  
FLOWERING BEHAVIOUR IN PYRETHRUM

(*Chrysanthemum cinerariaefolium* Vis.)

S. MOHANDASS

The results of the present investigation indicate that total spread of plant was increased by GA and TIBA sprays. Flowering could be advanced by CCC or TIBA sprays. The number and fresh and dry weights of flower were enhanced by spray of TIBA 100 ppm or CCC 250 ppm so also for total pyrethrins in flowers. On the other hand, Ethrel had little or no effect for any of these characters.

In recent years, several plant growth regulators like Ethrel (2-Chloroethyl phosphonic acid), CCC (2-Chloroethyl trimethyl ammonium chloride), GA (Gibberellic Acid) and TIBA (2, 3, 5 - Triiodobenzoic acid) have extensively been employed for promoting flower induction and flowering in several ornamental plants. (Vijayakumar *et al.* 1976, Bhattacharjee and Mukherjee, 1979).

Indications are that quality of flowers could be also improved by sprays of GA<sub>3</sub> and Ethrel besides increasing flower yield (Jana and Biswas, 1979; Mukhapadhyay and Baner, 1983).

Therefore, any attempt towards increased flower production with higher pyrethrins by any means will be a boon to the growers of pyrethrum. The present study is an attempt in this direction by making use of some growth regulators.

MATERIALS AND METHODS :

Uniform seedlings of 60 days old were transplanted in the main

field. Growth regulators were sprayed one month after transplanting and continued at monthly intervals till flowering. A few drops of "Teepol" was added to the spray solution as a wetting agent.

The concentrations of GA<sub>3</sub> used were 25, 50, 75 and 100 ppm, TIBA at 50, 100, 250 and 500 ppm, CCC at 100, 250, 500 and 1000 ppm and those of Ethrel were 50, 100, 250 and 500 ppm. Control with no spray was also maintained.

The experiment was laid out in a Randomized Block Design with two replications. The plot size was 4.50 M x 2.25 M and the plants were spaced at 45 cm x 45 cm. There were 50 plants per replication. The trial was conducted for one full year and the mean values are furnished in the table. 1.

Observations were taken on six parameters (detailed in the Results and Table.) The values for total plant spread was arrived at by multiplying the values of plant spread at North-

\* Present Address : Assistant Professor, Water Technology Centre TNAU., Coimbatore-3.

Table 1. Regulation of Flowering in Pyrethrum by Some Hormonal Sprays

Growth Regulator	Concentration (ppm)	Total plant spread (sq. cm.)	No. of days taken for flowering	No. of flowers/plot	Wt. of flowers (g/plot)		Cal. dried flower yield (kg/ha)	Total pyrethrin (%)
					Fresh	Dried		
GA	25	2488.88	130.0	340.9	274.50	113.18	111.78	1.140
	50	2670.05	140.5	351.1	273.79	113.18	111.79	1.131
	75	2575.69	137.5	346.7	272.44	110.80	109.43	1.150
	100	2506.75	135.0	309.5	238.48	98.92	97.70	1.154
	Mean	2560.343	135.75	337.05	260.803	109.023	107.676	1.1438
TIBA	50	1976.75	127.5	419.8	316.16	130.71	129.10	1.161
	100	2065.70	130.0	476.4	370.47	153.11	151.22	1.172
	250	2060.66	129.5	458.8	329.31	135.72	134.05	1.131
	500	1950.00	131.5	380.8	303.00	124.61	123.07	1.217
	Mean	2013.278	129.63	433.95	329.735	136.038	134.358	1.1703
CCC	100	1950.59	123.0	441.2	325.35	135.36	133.69	1.146
	250	1860.00	127.0	479.0	323.98	152.21	150.33	1.168
	500	1850.05	125.5	423.4	319.41	127.21	125.64	1.162
	1000	1705.75	130.0	363.2	286.51	112.90	111.51	1.160
	Mean	1841.598	126.38	426.70	313.823	131.920	130.293	1.1590
ETHREL	50	1575.60	130.5	350.4	277.00	113.65	112.25	1.150
	100	1505.75	140.0	328.7	266.08	106.30	104.99	1.155
	200	1500.07	142.5	292.5	234.47	94.95	93.78	1.109
	500	1485.75	147.0	257.6	207.15	84.23	83.19	1.145
	Mean	1516.793	140.00	307.30	246.175	99.784	98.550	1.1397
Control		1986.70	135.5	286.4	214.23	87.92	86.83	1.163
	SE		3.1	14.5	14.03	4.35	—	—
CT at 5%			12.9	43.5	42.06	13.04	—	—

South and East-West directions. The days taken for flowering was noted from the date of transplanting to the date of first flowering under different treatments. The total pyrethrins content was analysed in the dry flowers by adopting Mercury Reduction Method. (A.O.A.C., 1965).

## RESULTS AND DISCUSSION

In general, the greatest retardation in total spread was observed in plants treated with Ethrel followed by CCC. GA<sub>3</sub> at 50 and 75 ppm appeared to be the most effective treatments. TIBA also had negative

effect for spread of the plant but not as effectively as CCC or Ethrel. This detrimental effect of CCC and Ethrel might be attributed to the prevention of cell division or severely inhibiting the meristematic activity by these chemicals.

The differences in the time of flowering were highly significant. CCC, in general, advanced flowering by about nine days followed by TIBA (6 days) whereas GA<sub>3</sub> and Ethrel delayed it by a day when compared to control. This is in conformity with the findings of Bhattacharya and Madhava Rao (1982) with Papaya.

The number of flowers per plot increased with CCC and TIBA sprays. Treatments with CCC 250 ppm (479.0) and TIBA 100 ppm (476.4) recorded higher number of flowers which was significant over control (286.4). Ethrel at 500 ppm reduced the flower number to values significantly lesser than control.

Significantly higher fresh and dry weights of flowers were noted under TIBA 100 ppm (370.47 and 153.11g) and CCC 250 ppm (323.98 and 152.21 g) when compared to control (214.23 and 87.92 g respectively). Ethrel at 500 ppm reduced the fresh and dry weights of flowers (207.15 and 84.23 g respectively), though not significantly, over control. Increase in flower weight due to TIBA and CCC treatments might be attributed to lesser demand for food materials synthesized by the treated plants resulting in reduced vegetative growth as evidenced by lesser plant spread in the present study. This excessive carbohydrate reserves might in turn have accelerated that plants to enter into the reproductive phase (Chhonkar *et al.*, 1977).

The total pyrethrin content, active ingredient, was increased with TIBA spray at 100 ppm followed by 250 ppm of CCC while it was decreased with Ethrel at 250 ppm.

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